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AN ARTIFICIAL KEY TO THE KANSAS GRASSES.

BY W. A. KELLERMAN, PH. D.,
State Agricultural College.

[Descriptions of the species are given under corresponding numbers in "The Native Grasses of Kansas," published in the Report of the State Board of Agriculture for the Quarter ending March 31, 1889.]

Spikelets sessile on opposite sides of a jointed, or channeled rachis, forming a simple spike (1).

Spikelets not as above (5).

1. Spikelets single at each joint of the rachis (2).
 1. Spikelets 2 or more at each joint of the rachis (3).
 2. Spikelets one-flowered, partly immersed in the triangular rachis.....**30** SCHEDONNARDUS.
 2. Spikelets many-flowered, placed edgewise on the rachis.....**52** LOLIUM.
 2. Spikelets several-flowered, placed flatwise on the rachis.....**53** AGROPYRUM.
 3. Outer glumes anterior, forming a sort of involucre (4).
 3. Outer glumes none or 1-2 awn-like rudiments.....**56** ASPRELLA.
 4. All the spikelets perfect and similar.....**55** ELYMUS.
 4. Central spikelet of each cluster perfect and sessile, the two lateral short-stalked and sterile.....**54** HORDEUM.
 5. Spikelets in a coriaceous, spiny involucre, or bur.....**7** CENCHRUS.
5. Spikelets capitate; small grasses, creeping or stoloniferous (6).
5. Spikelets not as above (7).

-
6. Fls. dioecious, staminate fls. in conspicuous spikes; perennial.....**34** BUCHLOE.
 6. Fls. perfect (or upper imperfect); an annual creeping grass.....**35** MUNROA.
7. Fls. monoecious in jointed spikes; upper spikelets staminate sessile; lower spikelets pistillate, and imbedded in the thickened cartilaginous rachis... **1** TRIPSACUM.
 7. Flowers not as above (8).
8. Fls. crowded in a dense cylindrical spike (9).
 8. Fls. in one-sided spikes or branches of the panicle (19).
 8. Fls. in simple, racemose, spicate, contracted or more or less spreading panicles (34).
9. Spike oval, or at most oblong; very dense.....**10** PHALARIS.
 9. Spike cylindrical (10).
10. Spike very dense and cylindrical (11).
 10. Spike less dense or very loose (12).
11. Flowering glume with a slender dorsal awn.....**18** ALOPECURUS.
 11. Flowering glume destitute of an awn.....**17** PHLEUM.
12. Several bristles below the articulation of the spikelets..... **6** SETARIA.
 12. No bristles below the articulation of the spikelets (13).
13. Outer glumes long-awned, flowering glumes generally awned.....**20** POLYPOGON.
 13. Outer glumes often bristle-pointed, flowering glumes triple-awned.....**12** ARISTIDA.
 13. Outer glumes not long-awned, flowering glumes not triple-awned (14).
14. Glumes blunt, acute, or pointed, but not awned (15).
 14. Some of the glumes awned (17).
15. Spikelets 3-5-flowered, compressed.....**42** KOELERIA.
 15. Spikelets 1-flowered, occasionally a rudiment above (16).
16. Lower outer glume longer than the flowering glume.....**22** AGROSTIS.
 16. Outer glumes small or nearly as large as the flowering glume.....**15** MUHLENBERGIA.
17. Spikelets 1-flowered, 6 glumes present, no true palet.....**11** ANTHOXANTHUM.
 17. Spikelets 1-flowered, but only 4 glumes present (18).
18. Lower outer glume larger than the flowering glume.....**22** AGROSTIS.
 18. Outer glumes small or nearly as large as the flowering glume.....**15** MUHLENBERGIA.
19. Flowers dioecious, the pistillate in short capitate spikes.....**34** BUCHLOE.
 19. Flowers not as above (20).
20. Glumes (or palets) only two, chartaceous, strongly compressed..... **9** LEERSIA.
 20. Glumes (including palets) more than two (21).
21. Spikelets with one perfect flower and two empty, hairy, nearly equal outer glumes, with a cup-like or annular swelling of the pedicel just below the spikelet..... **4** ERIOCHLOA.
 21. Spikelets, etc., not as above (22).
22. Spikelets with one or more flowers, but only one perfect (23).
 22. Spikelets with two or more perfect flowers (31).
23. Flowers in indistinctly one-sided spikes or bunches (24).
 23. Flowers in strictly one-sided spikes or clusters (27).
24. Spikelets solitary at each joint of the slender triangular rachis, and partly immersed in an excavation.....**30** SCHEDONNARDUS.
 24. Spikelets not as above (25).
25. Stamen 1, palet only 1-nerved, nearly as long as its glume.....**21** CINNA.
 25. Stamens 2 or 3, palet 2-keeled or 2-nerved (26).
26. Spikelets several-flowered, flowering glumes awnless.....**33** LEPTOCHLOA.
 26. Spikelets with 1 (or rarely 2) perfect flower and a bristle-like rudiment or awn-like pedicel.....**29** GYMNOPOGON.
27. Spikelets sessile and remotely alternate on long and filiform branches of the panicle, flowers awned.....**29** GYMNOPOGON.
 27. Spikelets not as above, flowers awned or awnless (28).
28. Flowers awned (29).
 28. Flowers awnless (30).
29. Spikes digitate or fasciculate at the summit of the culm.....**28** CHLORIS.
 29. Spikes numerous in a racemose panicle, or one terminal; spikelets densely crowded.....**31** BOUTELOUA.

30. Spikes solitary or paniculate, spreading or deflexed, flattened (80).27 SPARTINA.
30. Spikes triangular, racemose; spikelets *much* flattened.....33 LEPTOCHLOA.
31. Spikes racemed, slender, usually numerous.....47 DACTYLIS.
31. Spikelets in dense fascicles or glomerate clusters indistinctly or not at all one-sided.....32 ELEUSINE.
32. Spikes digitate at the summit of the culm, (sometimes scattering ones lower down); spikelets crowded.....29 GYMNOPOGON.
32. Spikes, etc., not as above (33).39 DIPLACHNE.
33. Spikelets with 1 (rarely 2) perfect flower and a bristle-like rudiment or awn-like pedicel.....29 GYMNOPOGON.
33. Spikelets not as above, many-flowered, narrow.....29 GYMNOPOGON.
34. Spikelets sessile and remotely alternate on long and filiform branches of the panicle, one (or 2) flowered and a bristle-like rudiment or an awn-like pedicel.....36 PHRAGMITES.
34. Spikelets not as above (35).41 EATONIA.
35. Spikelets two-flowered (36).25 DESCHAMPSIA.
35. Spikelets three to many-flowered (41).43 MELICA.
35. Spikelets one-flowered, at least but one flower perfect (52).48 POA.
36. Swamp grasses, very tall (7-12 ft.), with long and broad leaves.....19 SPOROBOLUS.
36. Not as above (37).26 DANTHONIA.
37. Second glume broadly obovate, not keeled.....36 PHRAGMITES.
37. Second glume not broadly obovate (38).42 Not as above (43).
38. Flowering glumes with a fine dorsal awn below the middle.....46 DACTYLIS.
38. Flowering glumes destitute of awns (39).45 UNIOLA.
39. Palet about equaling the flowering glume (40).43 MELICA.
39. Palet shorter than its glume, ciliate on keel and apex.....48 POA.
40. Spikelets usually more than 2-flowered, somewhat compressed.....19 SPOROBOLUS.
40. Spikelets usually one (rarely 2) flowered, not compressed.....26 DANTHONIA.
41. Flowering glumes with a flattish, twisted, bent awn.....36 PHRAGMITES.
41. Awns absent or not as above (42).42 Not as above (43).
42. Swamp grasses, very tall (7-12 ft.), with long and broad leaves.....46 DACTYLIS.
42. Not as above (43).45 UNIOLA.
43. Spikelets in dense fascicles or glomerate clusters at the ends of the short branches of a close, short panicle.....43 MELICA.
43. Spikelets not as above (44).48 POA.
44. Drooping flat spikelets an inch long and nearly half an inch wide.....19 SPOROBOLUS.
44. Spikelets not as above (45).26 DANTHONIA.
45. Flowering glumes 3 to 5 or many-nerved, more or less involute, the upper two or more empty or imperfect.....36 PHRAGMITES.
45. Flowering glumes 5 to many-nerved, the upper one empty (46).42 Not as above (43).
45. Flowering glumes 3 or one-nerved (47).46 DACTYLIS.
46. Flowering glumes rigidly membranaceous or subcoriaceous, faintly many-nerved, much compressed and keeled; spikelets many-flowered dioecious,46 DISTICHLIS.
46. Flowering glumes 5-7-nerved, often with a few loose or webby hairs at base; spikelets somewhat compressed, usually 2-5-flowered.....48 POA.
46. Flowering glumes obtuse, more or less denticulate at the apex, not keeled but rounded on the back, 5 to 9-nerved, the nerves separate and all vanishing before reaching the apex; spikelets terete or flattish.....49 GLYCERIA.
46. Flowering glumes narrow, rounded on the back, more or less distinctly 3-5-nerved, acute or tapering into a straight awn.....50 FESTUCA.
46. Flowering glumes rounded on the back or compressed and keeled, 5-9-nerved, acute or awned from below the mostly 2-cleft apex, grain adhering to the palet.....51 BROMUS.
47. Second glume broadly obovate, shorter than the spikelet, not keeled, 3-nerved.....41 EATONIA.
47. Second glume not broadly obovate (48).
48. Flowering glumes not keeled but rounded on the back, (at least below,) the palet broad (49).
48. Flowering glumes keeled (50).

49. Flowering glumes broadly ovate, rigidly coriaceous, the 3 nerves prominent and uniting to form a pointed tip, stamens 2.....**44** DIARRHENA.
49. Flowering glumes not as above, either cuspidate, or 3-toothed or erose; stamens 3.....**37** TRIODIA.
50. Spikelets narrow, sessile or nearly so, more or less distant on the long branches of the panicle, usually in 2 rows.....**39** DIPLACHNE.
50. Spikelets 3-5-flowered, numerous in a dense spike-like cylindrical or interrupted panicle.....**42** KOELERIA.
50. Spikelets pedicellate or sessile, but not as above (51).
51. Spikelets usually many-flowered, palet shorter than the glume, often persisting after the grain and glume have fallen away.....**40** ERAGROSTIS.
51. Spikelets ovate, 3-5-flowered; palet longer than its glume, of nearly the same texture, bidentate, folded lengthwise in the middle and with the two keels folded in the opposite direction.....**38** REDFIELDIA.
52. Culm with a single, uniform, cylindrical (or oval) spike or spike-like panicle (53).
52. Not as above (58).
53. Bristles below the spikelets (54).
53. No bristles present (55).
54. One or sometimes 2 small scales or bristles below the flower, spike ovoid.....**10** PHALARIS.
54. Conspicuous bristles below the spikelets, spike cylindrical..... **6** SETARIA.
55. Flowering glume terminating in a trifid awn, or apparently 3-awned.....**12** ARISTIDA.
55. Awns absent or not trifid (56).
56. Outer glumes long-awned from the apex.....**20** POLYPOGON.
56. Outer glumes acute (57).
57. Glumes 4, none of them awned.**10** PHALARIS.
57. Glumes 6, second pair awned on the back.....**11** ANTHOXANTHUM.
58. Outer glumes hairy, a peculiar cup-like or annular swelling of the pedicel just below the spikelet..... **4** ERIOCHLOA.
58. Not as above (59).
59. Swamp grasses, 7 to 12 feet tall, leaves very broad and long, panicle large terminal.....**36** PHRAGMITES.
59. Not as above (60).
60. Awns trifid, or apparently 3 awns.....**12** ARISTIDA.
60. Awns absent or not trifid (61).
61. Glumes (including palet) only 2; flowers monoecious..... **8** ZIZANIA.
61. Glumes (including palet) 6, second pair awned on the back.....**11** ANTHOXANTHUM.
61. Glumes (including palet), the normal number (62).
62. Flowering glume coriaceous, rigid, involute with a simple twisted awn from the apex.....**13** STIPA.
62. Flowering glume not as above (63).
63. Spikelets solitary at each joint of the slender triangular rachis of the panicle, each with one, or rarely 2 perfect flowers, and with a bristle-like rudiment or an awn-like pedicel.....**30** SCHEDONNARDUS.
63. Spikelets not as above (64).
64. Flowering glume hardened, often with a sharp-pointed and bearded pedicel at the base, awn twisted.....**13** STIPA.
64. Flowering glume awned, but not as above (65).
64. Flowering glume not awned (73).
65. Spikelets sessile and remotely alternate, on long and filiform branches of the panicle, each with one, or rarely 2 perfect flowers, and with a bristle-like rudiment or an awn-like pedicel.....**29** GYMNOPOGON.
65. Not as above (66).
66. Palet ciliate on the apex and keels, lateral nerves of the outer glumes vanishing within the scarious margin.....**43** MELICA.
66. Palet rigid, broad, stamens 2, grain very large, larger than the flower; flowering glume pointed, but not really awned.....**44** DIARRHENA.
66. Palet only one-nerved, stamen one, flowering glume awned near the apex.....**21** CINNA.
66. Palet not as above (67).

67. Flowers in simple or paniculate spikes, spikelets in pairs (one pedicillate) in the alternate notches of the rachis..... **2** ANDROPOGON.
67. Flowers not as above (69).
68. Spikelets in a simple racemose panicle, outer glumes minute, the upper about half a line long, palet hyaline and bifid at the apex..... **16** BRACHYELYTRUM.
68. Not as above (69).
69. Spikelets one-flowered, with a bristle-like or pedicillate hairy rudiment opposite the palet.....**23** CALAMAGROSTIS.
69. Not as above (70).
70. Palet about as long as the flowering glume, and of the same texture.....**15** MUHLENBERGIA.
70. Palet shorter than the flowering glume, or wanting (71).
71. Inflorescence in simple or paniculate spikes..... **2** ANDROPOGON.
71. Inflorescence paniculate (72).
72. Spikelets one-flowered, flowering glume awned on the back.....**22** AGROSTIS.
72. Fertile spikelets one-flowered, sessile between two pedicillate sterile spikelets at the end of the slender branches of the panicle..... **2** ANDROPOGON.
73. Palet ciliate on the keel and apex, the lateral nerves of the outer glumes vanishing within the scarious margin.....**43** MELICA.
73. Palet (and glumes) sparingly ciliate, hyaline, glumes with hyaline margins..... **2** ANDROPOGON.
73. Palet not as above (74).
74. Lower glume narrow-keeled, the second broadly obovate not keeled, 3-nerved, scarious-margined, flowering glumes oblong.....**41** EATONIA.
74. Lower glume narrow, the second ovate, 5-nerved, keeled, flowering glumes broadly ovate, rigidly coriaceous.....**44** DIARRHENA.
74. Not as either of the above (75.)
75. Flowers with a tuft of hairs at base (76).
75. Flowers destitute of a tuft of hairs (77).
76. Outer glumes nearly equal, rigid, 5-nerved, palet sulcate between the keels,**24** AMMOPHILA.
76. Outer glumes unequal, thinly membranaceous, palet 2-toothed.....**23** CALAMAGROSTIS.
77. The perfect flower of the spikelet closed coriaceous or cartilaginous, stigmas usually purple..... **5** PANICUM.
77. Flower not as above (78).
78. Palet shorter than the flowering glume, frequently reduced to a small scale or wanting, outer glumes nearly equal or the lower rather longer.....**22** AGROSTIS.
78. Palet about equaling the flowering glume, and of the same texture (79).
79. Flowering glume with a very short usually hairy callus, mucronate or awned, outer glumes from small or minute to nearly as large as the flowering glume, persistent, sometimes bristle-pointed.....**15** MUHLENBERGIA.
79. Flowering glume destitute of a callus and unawned, outer glumes unequal, the lower one shorter, often acute, but really unawned.....**19** SPOROBOLUS.
80. Spikelets with one terminal perfect flower, the flowering glume more or less concave, becoming indurated, embracing the short palet, which is of the same texture..... **3** PASPALUM.
80. Spikelets with one perfect terminal flower, and usually a second (staminate or rudimentary) one below, glume of the terminal flower with its palet usually of coriaceous texture..... **5** PANICUM.

1. TRIPSACUM L.

- a. Spikes 4 to 8 inches long, at the summit and from upper sheaths **1**
- 1.* *Tripsacum dactyloides* L.; Gama grass, Sesame grass.

2. ANDROPOGON L.

- a. Panicle terminal and narrowly oblong (6-12 inches), yellowish or russet..... **9**
- a. Peduncle solitary, bearing a single spike..... **2**
- a. Spikes more numerous (b).
- b. Culms bushy — branched at summit, spikes in thick, leafy clusters..... **4**
- b. Culms, etc., not as above (c).

* The species, with corresponding numbers, also descriptions, are given in "The Native Grasses of Kansas," in the Quarterly Report of the State Board of Agriculture, March, 1889.

c. Spikes 1 in. long, 2 or 3 together, in distant clusters, shorter than bracts.....	8
c. Spikes 1-2 inches long, slender, single and scattered, not as above.....	3
c. Spikes in pairs or clustered, or digitate (<i>d</i>).	
<i>d</i> . Stamens 3, spikes digitate, hairs short and sparse.....	5
<i>d</i> . Like the above, but glaucous, villous with white or yellowish hairs.....	6
<i>d</i> . Fert. fl. with 1 stamen, spikes in pairs or fours, hairs long, white, dense.....	7
2. <i>Andropogon tener</i> Kunth.; Broom grass.	
3. <i>A. scoparius</i> Mx.; Little Blue Stem, Wood grass, Broom grass.	
4. <i>A. macrourus</i> Mx.; Heavy-topped Broom grass.	
5. <i>A. provincialis</i> Lam.; Big Blue Stem, Broom grass.	
6. <i>A. Hallii</i> Hack.; Hall's Broom grass.	
7. <i>A. saccharoides</i> Swz.; Broom grass.	
8. <i>A. Virginicus</i> L.; Broom grass.	
9. <i>A. nutans</i> L.; Wood grass, Indian grass, Bushy Blue Stem.	

3. PASPALUM L.

a. Spikelets two-rowed (<i>b</i>).	
a. Spikelets four-rowed, dense, orbicular, and obtuse.....	10
<i>b</i> . Spikes with a thin and keeled rachis with incurved margins.....	11
<i>b</i> . Spikes not as above (<i>c</i>).	
c. Spikelets $\frac{1}{2}$ line wide, narrowly two-rowed	12
c. Spikelets over one line wide, broadly two-rowed.....	13
10. <i>Paspalum virgatum</i> L.	
11. <i>P. fluitans</i> Kunth.; Marsh Paspalum.	
12. <i>P. setaceum</i> Mx.; slender Paspalum.	
13. <i>P. leve</i> Mx.; smooth Paspalum.	

4. ERIOCHLOA H. B. K.

a. Stem erect, the nodes and stem above pubescent.....	14
14. <i>Eriochloa punctata</i> Hamilt.	

5. PANICUM L.

a. Spikes mostly digitate, flat, one-sided (<i>b</i>).	
a. Spikelets imbricate-spiked, panicle simple or comp., often with stiff hairs (<i>c</i>).	
a. Spikelets scattered, in panicles (<i>d</i>).	
<i>b</i> . Spikelets ovoid, about 1 line long, second glume equaling the flower.....	15
<i>b</i> . Spikelets oblong, about $1\frac{1}{2}$ lines long, second glume $\frac{1}{2}$ length of flower.....	16
c. Panicle dense, spikes 1-3 inches long, more or less compound.....	31
c. Panicle slender, its branches simple, the perfect flower less pointed; resembles small and smooth forms of the last.....	32
<i>d</i> . Panicle small, narrow, branches few, erect (<i>e</i>).	
<i>d</i> . Panicle small but diffuse, oval or oblong (<i>f</i>).	
<i>d</i> . Panicle larger, oval or oblong (<i>g</i>).	
<i>d</i> . Panicle effuse, branches capillary and much subdivided (<i>j</i>).	
<i>d</i> . Panicle ample and diffuse; tall grasses (<i>l</i>).	
e. Lvs. 5-10 lines wide, strongly 9-11 nerved, margin scabrous.....	26
e. Lvs. erect, narrowly linear, sheaths usually pubescent.....	30
<i>f</i> . Spikelets $\frac{3}{4}$ -1 line long; plant very variable.....	29
<i>f</i> . Spikelets $1\frac{1}{2}$ - $1\frac{3}{4}$ lines long; also variable.....	28
g. Velvety-downy all over, except a narrow ring below each node.....	27
g. Smooth or hairy, but not as above (<i>h</i>).	
<i>h</i> . Lvs. broadly lanceolate from a cordate base, 3-4 in. long, $\frac{3}{4}$ -1 $\frac{1}{2}$ in. wide.....	23
<i>h</i> . Lvs. 4-8 inches long, lanceolate or oblong-lanceolate (<i>i</i>).	
i. Spikelets oval, five-eighths of a line long, culms stout, smooth.....	25
i. Spikelets oblong-ovate to obovate, $1\frac{1}{2}$ lines long, culms rigid, leafy to top.....	24
<i>j</i> . Panicle $\frac{1}{2}$ - $\frac{3}{4}$ length of culm, culm erect or decumbent below (<i>k</i>).	
<i>j</i> . Panicles terminal and lateral, culms decumbent, stout, sheaths flattened.....	19
k. Panicles $\frac{1}{2}$ - $\frac{3}{4}$ length of plant, much branched, sheaths very hairy.....	20
k. Panicle $\frac{1}{2}$ - $\frac{3}{4}$ length of plant, very effuse, capillary branches long, sparingly divided.....	21
<i>l</i> . Panicles terminal and lateral (<i>m</i>).	
<i>l</i> . Panicles terminal only, 6-18 in. long, culm 3-6 ft. high.....	22

- m.* Culms erect, 2-4 ft. high; root perennial (*n*).
m. Culms geniculate at the decumbent or procumbent base; annual..... 19
n. Culms stout, much branched above, spikelets racemose, crowded, mostly one-sided..... 18
n. Culms less stout, apex of spikelets a little curved..... 17
15. *Panicum glabrum* Gaud.; smooth Panic grass.
 16. *P. sanguinale* L.; Crab grass; Finger grass.
 17. *P. anceps* Mx.; two-edged Panic grass.
 18. *P. agrostoides* Spreng.; red-top Panic grass.
 19. *P. proliferum* Lam.; branching Panic grass.
 20. *P. capillare* L.; Old Witch grass; hair-stalked Panic grass.
 21. *P. autumnale* Bosc.; Autumn Panic grass.
 22. *P. virgatum* L.; Switch grass.
 23. *P. latifolium* L.; Broad-leaved Panic grass.
 24. *P. clandestinum* L.; Panic grass.
 25. *P. microcarpon* Muhl.; Panic grass.
 26. *P. xanthophysum* Gr.; Panic grass.
 27. *P. viscidum* Ell.; Panic grass.
 28. *P. scoparium* Lam.; Panic grass.
 29. *P. dichotomum* L.; Panic grass.
 30. *P. depauperatum* Muhl.; Panic grass.
 31. *P. Crus-galli* L.; Barnyard grass.
 32. *P. colonum* L.; Panic grass.

6. SETARIA Beauv.

- a.* Bristles in clusters, roughened or barbed upwards (*b*).
a. Bristles single or in pairs, roughened or barbed downwards..... 33
b. Spike tawny yellow, bristles 6-11, perfect flower wrinkled..... 34
b. Spike green, bristles few, perfect flower less distinctly wrinkled..... 35
33. *Setaria verticillata* Beauv.; Fox-tail grass.
 34. *S. glauca* Beauv.; Yellow Fox-tail.
 35. *S. viridis* Beauv.; Green Fox-tail, Pigeon grass, Bottle grass.

7. CENCHRUS L.

- a.* Stems branched and ascending, the fruit a pestiferous bur..... 36
 36. *Cenchrus tribuloides* L.; Sand-bur, Hedgehog grass.

8. ZIZANIA L.

- a.* Upper branches of panicle erect pistillate, lower spreading staminate..... 37
 37. *Zizania aquatica* L.; Wild Rice, Indian Rice, Water Oats.

9. LEERSIA Swartz.

- a.* Spikelets narrowly oblong, somewhat crowded (*b*).
a. Spikelets broadly oval, imbricately covering each other..... 40
b. Panicle simple, spikelets 1½ lines long, stamens two..... 38
b. Panicle diffusely branched, spikelets 2½-3 lines long, stamens three..... 39
38. *Leersia Virginica* Willd.; White grass.
 39. *L. oryzoides* Swz.; Cut grass, White grass, False Rice.
 40. *L. lenticularis* Mx.; Fly-catch grass.

10. PHALARIS L.

- a.* Panicle dense spike-like, oval or oblong (*b*).
a. Panicle branched, the clusters open in anthesis..... 43
b. Spike oval, culm one to two feet high..... 41
b. Spike oblong, 1-2 (or more) inches long, culm taller..... 42
41. *Phalaris Canariensis* L.; Canary grass.

42. *P. intermedia* Bosc.; Southern Reed-Canary grass, California Timothy.

43. *P. arundinacea* L.; Reed-Canary grass.

11. ANTHOXANTHUM L.

a. Culms slender; very sweet-scented in drying..... 44

44. *Anthoxanthum odoratum* L.; Sweet Vernal grass.

12. ARISTIDA L.

a. Awns separate to the base, not *jointed* with the glume (*b*).

a. Awns *jointed* with the glume below their junction..... 50

b. Awns *very* unequal, the elongated middle one bent (*c*).

b. Awns all diverging and alike, or lateral ones but little shorter (*e*).

c. Outer glumes 9-10 lines long, 3-5-nerved..... 45

c. Outer glumes 3-4 lines long, carinately 1-nerved (*d*).

d. Lateral awns 6-7 lines long, middle one 10-12 lines..... 47

d. Awns much shorter: culms much branched throughout..... 46

e. Panicle spiked, 10-18 inches long (*f*).

e. Panicle loosely few-flowered, at most 6 inches long (*g*).

f. Awns much longer than the flower, middle one about one inch..... 52

f. Awns about the length of the flower, 6 lines or shorter..... 48

g. Stems simple, 6-15 inches high, panicle 3-6 inches long, awns long or short, outer glumes
purplish..... 49

g. Stems tufted, low, awns capillary exceeding the slender flower, 1½-3 inches long..... 51

45. *Aristida ramosissima* Englm.; Triple-awned grass.

46. *A. dichotoma* Mx.; Beard grass, Three-awned grass.

47. *A. gracilis* Ell.; Beard grass, Three-awned grass.

48. *A. stricta* Mx.; Beard grass, Three-awned grass.

49. *A. purpurea* Nutt.; Beard grass, Three-awned grass.

50. *A. desmantha* Trin.; Beard grass, Three-awned grass.

51. *A. oligantha* Mx.; Beard grass, Three-awned grass.

52. *A. purpurascens* Poir.; Tall Beard grass, Triple-awned grass.

13. STIPA L.

a. Awns 4-7 inches long, panicle more or less contracted (*b*).

a. Awns 2-3 inches long, panicle open..... 53

a. Awns 1-1½ inches long, panicle narrow, loose, long..... 55½

b. Panicle loose, 8-12 inches long..... 54

b. Panicle narrow and contracted, base of grain more pointed..... 55

53. *Stipa avenacea* L.; Black Oat grass.

54. *S. comata* Trin. & Rupr.; Porcupine grass, Feather grass.

55. *S. spartea* Trin.; Porcupine grass, Feather grass.

55½. *S. Viridula* Trin.; Bunch Grass, Porcupine grass.

14. ORYZOPSIS Mx.

a. Awn thrice the length of the blackish flowering glume..... 56

56. *Oryzopsis melanocarpa* Muhl.; Mountain rice.

15. MUHLENBERGIA Schreb.

a. Panicles contracted or glomerate (*b*).

a. Panicles very loose and open, the long branches capillary..... 64

b. Flowering glumes barely mucronate or sharp-pointed (*c*).

b. Flowering glumes bristle-awned from the tip (*e*).

c. Outer glumes awnless but pointed (*d*).

c. Outer glumes awned, panicle oblong-linear, spike-like..... 58

d. Culms rarely branching, 1-2 ft. high, panicle simple, very slender..... 57

d. Culms much branched, 2-3 ft. high, panicles lateral and terminal, linear..... 59

e. Floret with an oblique callus bearing hairs as long as the floret..... 61

e. Not as above (*f*).

- f.* Outer glumes bristle-pointed, nearly as long as the flowering glume..... 60
- f.* Outer glumes short-pointed, half the length of the flowering glume..... 62
- f.* Outer glumes extremely minute, the lower obsolete; culms much-branched..... 63
- 57. *Muhlenbergia sobolifera* Trin.
- 58. *M. glomerata* Trin.; Spiked Muhlenbergia.
- 59. *M. Mexicana* Trin.; Mexican Muhlenbergia.
- 60. *M. sylvatica* T. & G.; Wood grass.
- 61. *M. comata* Benth.; Woolly Muhlenbergia.
- 62. *M. Willdenovii* Trin.; Willdenows Muhlenbergia.
- 63. *M. diffusa* Schr.; Nimble Will, Wire grass.
- 64. *M. capillaris* Kunth.; Hair grass.

16. BRACHYELYTRUM Beauv.

- a.* Culms 1-3 ft. high, creeping root-stocks, downy sheaths..... 65
- 65. *Brachyelytrum aristatum* Beauv.; Short-glumed grass.

17. PHLEUM L.

- a.* Spike cylindrical elongated, outer glumes ciliate and bristle-pointed..... 66
- 66. *Phleum pratense* L.; Timothy, Herd's grass, Cat's-tail grass.

18. ALOPECURUS L.

- a.* Stems upright, $\frac{1}{2}$ -2 feet high (*b*).
- a.* Stems decumbent, bent at the lower joints (*c*).
- b.* Stems $\frac{1}{2}$ -2 feet high, outer glumes with long hairs on the back..... 67
- b.* Stem about 2 feet high, awn exerted more than half its length..... 68
- c.* Awn from (near base of) outer glume projecting half its length 69
- c.* Like the last, but glaucous, and awn shorter and arising higher..... 70
- 67. *Alopecurus alpinus* Sm.; Alpine Fox-tail.
- 68. *A. pratensis* L.; Meadow Fox-tail.
- 69. *A. geniculatus* L.; Water Fox-tail.
- 70. *A. aristulatus* Mx.; Short-bearded Fox-tail.

19. SPOROBOLUS R. Br.

- a.* Panicles spiked or contracted (*b*).
- a.* Panicles generally open (*g*).
- b.* Outer glumes very unequal (*c*).
- b.* Outer glumes somewhat equal (*d*).
- c.* Culms $1\frac{1}{2}$ -4 feet high, leaves long (*d*).
- c.* Culms (6-12 inches high) and leaves very slender, root perennial..... 74
- d.* Spikelets 2-3 lines long, lowest leaves rigid, rough on edges..... 72
- d.* Spikelets less than one line long, narrow, lowest glume obtuse or truncate..... 71
- e.* Root annual, culms ascending, grain linear..... 73
- e.* Root perennial (*f*).
- f.* Outer glumes very acute, flowering glume cuspidate..... 74
- f.* Outer glumes obtuse, panicle of few solitary distant erect rays..... 75
- g.* Outer glumes purplish, very unlike, upper ovate, grain round 76
- g.* Not as above (*h*).
- h.* Rays of panicle verticillate, 8 (or more) at base, fewer above..... 79 $\frac{1}{2}$
- h.* Rays of panicle in pairs or solitary (*i*).
- i.* Outer glumes very unequal (*j*).
- i.* Outer glumes nearly equal, stems 6-15 inches, branched or decumbent..... 79
- j.* Rays of panicle flower-bearing to base, sheaths strongly-bearded at throat..... 77
- j.* Rays naked below, sheaths with a few long hairs at throat..... 78
- 71. *Sporobolus Indicus* R. Br.; Smut grass.
- 72. *S. asper* Kunth.; Rough Drop-seed grass.
- 73. *S. vaginaeflorus* Torr.; Drop-seed grass.
- 74. *S. cuspidatus* Torr.; Drop-seed grass.

75. *S. depauperatus* Torr.; Drop-seed grass.
 76. *S. heterolepis* Gr.; Drop-seed grass.
 77. *S. cryptandrus* Gr.; Drop-seed grass.
 78. *S. airoides* Torr.; Salt grass, Drop-seed grass.
 79. *S. asperifolius* N. & M.; Drop-seed grass.
 79½. *S. Arkansana* (Trin.); Drop-seed grass.

20. POLYPOGON Desf.

- a. Panicle dense, soft, yellowish-green; awns conspicuous, long..... 80
 a. Panicle narrow, much-lobed, usually purplish; awns shorter..... 81
 80. *Polypogon Monspeliensis* Desf.; Annual Beard-grass.
 81. *P. littoralis* Sm.; Perennial Beard-grass.

21. CINNA L.

- a. Panicle rather dense, branches spreading in flower, spikelets 2½-3 lines long..... 82
 a. Panicle loose and more slender, branches drooping in flower, spikelets 1½-2 lines long..... 82½
 82. *Cinna arundinacea* L.; Wood Reed grass.
 82½. *C. pendula* Trin.; Wood Reed grass.

22. AGROSTIS L.

- a. Palet present (*b*).
 a. Palet entirely wanting or very minute (*c*).
 b. Ligule short and truncate; panicle slender, usually spreading in flower..... 83
 b. Ligule long and acute, panicle as above..... 83½
 b. Ligule obtuse, flowering glume with a longitudinal furrow on back..... 84
 c. Culms firm or stout, 2-3 ft. high; upper ligules 2-3 lines long..... 85
 c. Culms slender or very slender, 1-2 feet high (*d*).
 d. Stems slender, panicle pale-green, branches fl.-bearing from or below the middle..... 86
 d. Stems very slender, panicle purplish, branches fl.-bearing at or near apex..... 87
 83. *Agrostis vulgaris* With.; Red-Top, Fine-Top, Borden's grass, Bent grass.
 83½. *A. alba* L.; Fiorin, White Bent grass, Red-Top.
 84. *A. exarata* Trin.; Northern Red-Top, Mountain Red-Top.
 85. *A. elata* Trin.; Bent grass.
 86. *A. perennans* Tuck.; Thin grass, Bent grass.
 87. *A. scabra* Willd.; Hair grass.

23. CALAMAGROSTIS Roth.

- a. Awn delicate, straight, not exceeding the hairs..... 88
 a. Awn bent or twisted when dry, surpassing the flowering glume..... 89
 88. *Calamagrostis Canadensis* Beauv.; Small Reed-grass, Blue-Joint.
 89. *C. confinis* Nutt.; Reed Bent-grass.

24. AMMOPHILA Host.

- a. Culms 3-6 ft. high, panicle 4-16 inches long, palet equal and similar to glume..... 90
 90. *Ammophila longifolia* Vasey; Long-leaved Reed grass.

25. DESCHAMPSIA Beauv.

- a. Awn slender, about as long as fl.-glume, culm 2-4 feet high..... 91
 a. Awn about half longer, becoming bent and twisted, culm 1½-2 ft..... 92
 91. *Deschampsia flexuosa* Griseb.; Wood Hair grass.
 92. *D. caespitosa* Beauv.; Hair grass.

26. DANTHONIA DC.

- a. Culms tufted, low, spikelets few, 3-5 lines long..... 93
 93. *Danthonia spicata* Beauv.; Spiked Wild Oat grass.

27. SPARTINA Schreb.

- a. Culm 3-6 (or more) feet high, leaves 2-4 feet long..... 94
- a. Culm 1-2 feet high, slender, leaves narrow and rush-like..... 95
- 94. *Spartina cynosuroides* Willd.; Cord grass, Marsh grass.
- 95. *S. juncea* Willd.; Marsh grass, Salt grass, Rush Salt grass.

28. CHLORIS Swz.

- a. Culm compressed, branched at base, spikes filiform..... 96
- 96. *Chloris verticillata* Nutt.

29. GYMNOPOGON Beauv.

- a. Flowers on long filiform spikes crowded into a raceme..... 97
- 97. *Gymnopogon racemosus* Beauv.; Naked Beard grass.

30. SCHEDONNARDUS Steud.

- a. Panicle consisting of slender, naked, triangular spikes..... 98
- 98. *Schedonnardus Texanus* Steud.; Texas Spike grass.

31. BOUTELOUA Lag.

- a. Spikes pectinate oblong or linear, solitary or few, in a raceme (b)..... 101
- a. Spikes short, in a long virgate one-sided spike or raceme..... 101
- b. Glumes with dark, warty glands and bristly hairs, sterile flower glabrous..... 99
- b. Glumes soft, hairy, pedicel of sterile flower villous-tufted..... 100
- 99. *Bouteloua hirsuta* Lag.; Bristly Mesquite, Gramma grass.
- 100. *B. oligostachya* Torr.; Mesquite grass, Gramma grass.
- 101. *B. racemosa* Lag.; Tall Gramma grass.

32. ELEUSINE Gaert.

- a. Spikes digitate, spikelets on one side of a flattish rachis..... 102
- 102. *Eleusine Indica* Gaert.; Yard grass, Crow-foot, Crab grass, Wire grass.

33. LEPTOCHLOA Beauv.

- a. Flowers in a long, panicle raceme, spikes slender, numerous..... 103
- 103. *Leptochloa mucronata* Kth.; Feather grass, Slender grass.

34. BUCHLOË Englm.

- a. Dioecious, very small, pistillate flowers inconspicuous..... 104
- 104. *Buchloe dactyloides* Englm.; Buffalo grass, False Mesquite grass.

35. MUNROA Torr.

- a. Flowers in leafy heads or clusters; stems rigid, creeping..... 105
- 105. *Munroa squarrosa* Torr.; False Buffalo grass.

36. PHRAGMITES Trin.

- a. A very tall swamp grass, with a large terminal panicle..... 106
- 106. *Phragmites communis* Trin.; Reed grass.

37. TRIODIA R. Br.

- a. Panicle large purplish, loose; spikelets lanceolate..... 107
- a. Panicle contracted, 3-5 inches long; spikelets few, ovate, turgid..... 108
- a. Panicle spike-like, dense, 6 in. long, $\frac{1}{4}$ in. wide; spikelets nearly as long as broad..... 109
- a. Panicle dense and ovoid or very simple and of few spikelets (b)..... 109
- b. Stems with usually a single node, panicle ovoid, 1-2 inches long..... 110
- b. Stems with numerous bearded joints, panicles very simple, axillary ones included..... 111
- 107. *Triodia cuprea* Jacq.; Tall Red-Top.

108. *T. ambigua* Vasey.
 109. *T. stricta* Vasey.
 110. *T. acuminata* Vasey.
 111. *T. purpurea* Vasey; Sand grass.

38. REDFIELDIA Vasey.

- a.* Culms flexuous, leaves rigid, panicles lax..... 112
 112. *Redfieldia flexuosa* Vasey.

39. DIPLACHNE Beauv.

- a.* Panicle 6-10 inches long, with 15-30 branches, flowering throughout..... 113
a. Panicle erect, stiff, 1-2 feet long, with numerous spreading spike-like branches..... 114
 113. *Diplachne fascicularis* Beauv.; Spike grass.
 114. *D. rigida* Vasey; Spike grass.

40. ERAGROSTIS Beauv.

- a.* Stems erect or diffusely spreading and ascending (*b.*).
a. Prostrate and creeping, spikelets clustered, linear lanceolate, 10-30-flowered..... 115
b. Culms branching and decumbent or spreading at base, panicle narrow (*c.*).
b. Culms simple or branching only at base, rigid, erect, panicle very large (*f.*).
c. Spikelets mostly large, 4-9 lines long, 10-20-flowered (*d.*).
c. Spikelets mostly small, 1-4½ lines long, 2-18-flowered (*e.*).
d. Panicle oblong or pyramidal, full-flowered, spikelets oblong or lanceolate, 3-6 lines long..... 116
d. Panicle 4-6 inches high, narrow, spikelets 4-9 lines long, leaves becoming involute..... 120
e. Spikelets 5-12-flowered, 2-4 lines long, about equaling their pedicels..... 117
e. Spikelets 2-5-flowered, 1-1½ lines long, on slender pedicels..... 118
e. Spikelets 5-18-flowered, 2-4½ lines long, mostly shorter than pedicels..... 119
f. Panicle 1-2½ feet long, virgate, very loose, leaves 1½-2 feet long..... 120½
f. Panicle widely expanding and diffuse (*g.*).
g. Panicle mostly naked in axils, spikelets 2-4-flowered, very small 121
g. Bearded in the axils, spikelets 5-15-flowered, large, 2-3 lines long..... 122
 115. *Eragrostis reptans* Nees.; Creeping Eragrostis.
 116. *E. major* Host.; Stinking grass, Pungent Meadow grass, Candy grass.
 117. *E. pilosa* Beauv.
 118. *E. Frankii* Mey.
 119. *E. Purshii* Schrad.
 120. *E. oxylepis* Torr.
 120½. *E. tenuis* Gray.
 121. *E. capillaris* Nees.
 122. *E. pectinacea* Gray.

41. EATONIA Raf.

- a.* Panicle dense and contracted, second glume broad and saccate..... 123
a. Panicle long and slender, loose, second glume not so broad..... 124
 123. *Eatonia obtusata* Gr.; Obtuse Eatonia, Prairie grass.
 124. *E. Pennsylvanica* Gr.; Eastern Eatonia, Prairie grass.

42. KOELERIA Pers.

- a.* Panicle narrowly spiked, interrupted or lobed at the base..... 125
 125. *Koeleria cristata* Pers.; Crested Koeleria, Prairie grass.

43. MELICA L.

- a.* Panicle simple or little branched..... 126
a. Panicle larger and more branched..... 126½
 126. *Melica mutica* Walt.; Melic grass.
 126½. *M. mutica* Walt., var. *diffusa* Gr.; Melic grass.

44. DIARRHENA Raf.

- a. Simple culm with long, linear-lanceolate flat leaves at base..... 127
127. *Diarrhena Americana* Beauv.

45. UNIOLA L.

- a. The very broad, flat spikelets on drooping pedicels..... 128
128. *Uniola latifolia* Mx.; Broad-flowered Fescue grass.

46. DISTICHLIS Raf.

- a. Leaves rigid and sharp-pointed, glumes many-nerved, coriaceous..... 129
129. *Distichlis maritima* Raf.; Salt grass, Marsh grass.

47. DACTYLIS L.

- a. Upper branches of panicle short, lower, longer and spreading..... 130
130. *Dactylis glomerata* L.; Orchard grass, Cock's-foot grass.

48. POA L.

- a. Flowering glumes compressed-keeled, acute (c).
a. Flowering glumes rounded on the back, obtuse (b).
b. Spikelets 3-7-flowered, outer glumes acute, rough on the back..... 131
b. Spikelets mostly 3-flowered, outer glumes very acute, rough on the mid-nerve..... 132
c. Low and spreading, 3-6 in. high, from an annual or biennial root, flaccid..... 133
c. Culms 6-20 in. long, geniculate-ascending, rigid, very much flattened..... 134
d. Spikelets mostly numerous, and crowded on rather short, rough branches (e).
d. Spikelets fewer and more scattered on slender pedicels, flowering early (f).
e. Ligules elongated, flowering glume very obscurely nerved, spikelets narrow. 135
e. Ligules short and blunt, flowering glume 5-nerved, hairy along the margin and keel..... 136
e. Ligules oblong, acute, flowering glume prominently 5-nerved, naked at the margins..... 137
f. Spikelets 3-4 lines long, flowering glume conspicuously scarious-tipped 140
f. Spikelets 1-2 lines long, flowering glume scarcely scarious-tipped (g).
g. Flowers oblong, obtuse, branches of panicle in fives or more..... 138
g. Flowers and glumes acute, branches of panicle in threes or fours..... 139
131. *Poa andina* Nutt.; Mountain Spear grass.
132. *P. tenuifolia* Nutt.; Oregon Blue grass.
133. *P. annua* L.; Annual Spear grass, Goose grass.
134. *P. compressa* L.; Wire grass, Blue grass.
135. *P. serotina* Ehr.; Fowl Meadow grass, False Red-Top.
136. *P. pratensis* L.; June grass, Ky. Blue grass, Spear grass, Meadow grass.
137. *P. trivialis* L.; Rough-Stalked Meadow grass.
138. *P. sylvestris* Gr.; Meadow grass, Spear grass.
139. *P. alsodes* Gr.; Tall Blue grass, Wood Spear grass.
140. *P. flexuosa* Muhl.; Meadow grass, Spear grass.

49. GLYCERIA R. Br.

- a. Flowering glume conspicuously nerved, styles present (b).
a. Flowering glume inconspicuously 5-nerved, stigmas nearly sessile..... 145
b. Spikelets linear, $\frac{1}{4}$ inch long, appressed, terete; panicle narrow..... 144
b. Spikelets ovate, oblong, or linear-oblong, 1-3 lines long (c).
c. Spikelets ovate, at length very broad and tumid, 2 lines long..... 141
c. Spikelets very numerous, ovate-oblong, 3-7 flowered, 1-2 lines long..... 142
c. Spikelets oblong, or linear-oblong, 5-9 flowered, about 3 lines long..... 143
141. *Glyceria Canadensis* Trin.; Rattlesnake grass, Tall Quaking grass.
142. *G. nervata* Trin.; Nerved Meadow grass, Nerved Manna grass.
143. *G. aquatica* Sm.; Reed Meadow grass, White Spear grass.
144. *G. fluitans* R. Br.; Floating Manna grass.
145. *G. distans* Wahl.; Manna grass.

50. *FESTUCA* L.

- a.* Flowers awned or bristle-pointed (*b.*)
- a.* Flowers awnless or nearly so (*d.*)
- b.* Awns conspicuous, about equaling or exceeding the flowering glume..... 146
- b.* Awns much shorter than the lanceolate flowering glumes (*c.*)
 - c.* Panicle few-flowered, contracted; spikelets ovate, about 4-flowered..... 147
 - c.* Panicle oblong, spreading; spikelets nearly terete, 5-7-flowered..... 148
- d.* Panicle contracted, with short ascending branches (*e.*)
- d.* Panicle very loose, with spreading or reflexed branches (*f.*)
 - e.* Spikelets 6-9-flowered, 6-9 lines long, leaves a foot long..... 150
 - e.* Spikelets 2-5-flowered, about 3 lines long, leaves about 8 in. long..... 149
 - f.* Spikelets 3-5-flowered, 3 lines long; culm 2-4 feet high..... 151
 - f.* Like the last, but stouter, and spikelets about 5-flowered..... 152
- 146. *Festuca tenella* Willd.; Small Fescue.
- 147. *F. ovina* L.; Sheep's Fescue grass.
- 148. *F. duriuscula* L.; Harsh Fescue grass.
- 149. *F. elatior* L.; Meadow, or Tall Fescue; Randall, or Evergreen grass.
- 150. *F. pratensis* Huds.; Meadow Fescue grass.
- 151. *F. nutans* Willd.; Drooping Fescue.
- 152. *F. Shortii* Kunth.; Short's Fescue.

51. *BROMUS* L.

- a.* Lower glume 3-5-nerved, second glume 5-9-nerved (*b.*)
- a.* Lower glume 1-nerved, second glume 3-nerved or obscurely 5-nerved..... 158
- b.* The awn small or scarcely any (*c.*)
- b.* The awn evident or conspicuous (*d.*)
 - c.* Panicle 6-10 inches long, spikelets 1-1½ inches long..... 153
 - c.* Panicle 4-6 inches long, spikelets oblong-ovate, turgid..... 154
- d.* Awn as long as or longer than the flowering glume (*e.*)
- d.* Awn shorter (*f.*)
 - e.* Spikelets oblong-ovate, turgid, sheaths sometimes hairy..... 155
 - e.* The conical-ovate spikelets and leaves downy..... 156
 - f.* Panicle spreading, spikelets of 8-10 rather distant flowers..... 154
 - f.* Panicle simple, small; spikelets 7-12-flowered, densely silky..... 157
- 153. *Bromus unioloides* Willd.; Schrader's grass, Rescue grass.
- 154. *B. secalinus* L.; Cheat, Chess.
- 155. *B. racemosus* L.; Upright Chess.
- 156. *B. mollis* L.; Soft Chess.
- 157. *B. Kalmii* Gray; Wild Chess.
- 158. *B. ciliatus* L.; Ciliate Chess.

52. *LOLIUM* L.

- a.* Spikelets 7-11-flowered, awnless or short-awned..... 159
- 159. *Lolium perenne* L.; Rye grass, Italian Rye grass.

53. *AGROPYRUM* Beauv.

- a.* Awn when present not longer than the flowering glume (*b.*)
- a.* Flowering glume and sometimes the outer glumes long awned (*c.*)
- b.* Culm 2-3 feet high, spike narrow, close, 3-6 inches long..... 160
- b.* Like the preceding, but no running root-stocks, spike narrow, slim..... 160½
- b.* Like the first, but more rigid and stouter, of a light bluish-green color..... 161
- c.* Spike more or less nodding (not strict), awn of flowering glume twice its length..... 162
- c.* Spike rigid and strict, awn of flowering glume half or fully its length..... 163
- 160. *Agropyrum repens* Beauv.; Couch, Quick, Quitch, Wheat, Twitch or Dog grass.
- 160½. *A. tenerum* Vasey; Wheat grass, Clump Wheat grass.
- 161. *A. glaucum* R. & S.; Western Wheat grass, Colorado Blue-Joint, Colorado Blue-Stem, Wild Quack grass, Gumbo grass.

162. *A. caninum* Reich.; Wheat grass.
163. *A. violaceum* Beauv.; Wheat grass.

54. HORDEUM L.

- a. Awns about 2 inches long, spike bushy in appearance..... 164
a. Awns about $\frac{1}{2}$ -inch long, spike not so bushy..... 165
164. *Hordeum jubatum* L.: Squirrel-tail grass.
165. *H. pusillum* Nutt.; Small Squirrel-tail grass.

55. ELYMUS L.

- a. Culms rather tall, 2-5 feet high, outer glumes with short or long awns (b).
a. Culms about a foot high (seldom 2 ft.), outer glumes long awned..... 169
b. More or less pubescent, spike usually slender, awn 1 inch long..... 168
b. Plant (except sometimes the flower) not pubescent (c).
c. Spike rigidly upright, peduncle short, often included in sheath..... 166
c. Spike (5-9 in. long) soon nodding, on an exserted peduncle..... 167
166. *Elymus Virginicus* L.; Wild or Smooth Rye grass, Terrell grass.
167. *E. Canadensis* L.; Wild Rye, Lyme grass, Terrell grass.
168. *E. striatus* Schultz; Rye grass, Dennett grass.
169. *E. Sitanton* Schl.; Rye grass, Small Western Rye grass.

56. ASPRELLA Willd.

- a. Spike loose, 3-6 inches long, spikelets early deciduous..... 170
170. *Asprella hystrix* Willd.; Bottle-brush grass.

THE HUMAN EYE: THE CHANGES WHICH OCCUR IN MIDDLE LIFE.

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The following are the changes which occur in the eye in or near middle life, which we will consider briefly:

First, that condition known as Presbyopia, or the sight of old age.

Second, Cataract.

Third, Myopia, or near-sightedness.

Fourth, Epiphora, or the overflow of tears upon the cheek.

The condition known as Presbyopia is due to a change in the consistency of the crystalline lens. In infancy the lens is composed of a somewhat elastic substance, held in position by a membrane known as the suspensory ligament; the posterior surface is more convex than the anterior, but when the suspensory ligament is relaxed the natural elasticity of the lens causes it to become more convex, particularly anteriorly, bringing the focus nearer the eye and at the same time the iris contracts, shutting out rays which would be rendered too divergent to come to a focus on the retina. In process of time the lens grows larger, heavier and less elastic, so that the focal distance for the eye or the distance of the near-point, as it is called, becomes greater, and when it exceeds ten inches, which is usually between the ages of forty and forty-five years, reading becomes tiresome or impossible, because at the distance at which the book is ordinarily held, the whole accommodation (that is, relaxation of the ligament referred to above) which is available has to be used, and hence fatigue is soon experienced; while if the book is held further away only large print can be read, because of the diminution in the size of the retinal images. The remedy for this is supplementing the accommodation by convex spectacles of such a strength as to bring the near-point back to nine inches. The hardening of the lens